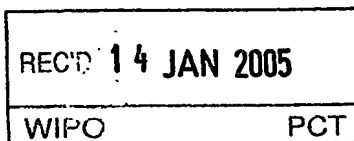




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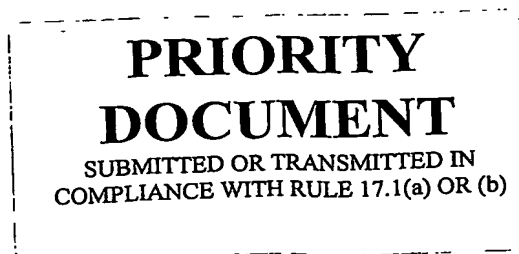
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I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003906657 for a patent by EDWARD DAVID ANSTEE as filed on 01 December 2003.



WITNESS my hand this  
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LEANNE MYNOTT  
MANAGER EXAMINATION SUPPORT  
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Regulation 3.2

EDWARD DAVID ANSTEE

**A U S T R A L I A**

Patents Act 1990

**PROVISIONAL SPECIFICATION**

for the invention entitled:

**COUPLING MEMBER**

The invention is described in the following statement:

- 1 -

5

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## COUPLING MEMBER

This invention relates to a coupling member.

15        More particularly, the invention relates to a coupling member which includes a hook and a closure shaft which can be used for connecting to a loop or line. Typically, the coupling member could be used for securing lines in mountaineering, cave diving or other situations where a secure but releasable connection needs to be to a line or loop.

20        One known form of shackle has a hook at one end and a swivel connected eyelet at the other. A spring loaded shaft is provided to co-operate with the hook to form a closed loop. Normally the free end of the spring loaded shaft simply bears against the terminal part of the hook. This is not a particularly secure arrangement because the spring loaded hook could be inadvertently moved to its open position against the action of the spring.

25        Also, when the shackle is used to couple to a line which is under tension, release of the shackle can be difficult because it is necessary to move the line over the end of the hook against the tension in the line. When the tension is high, this can make release of the shackle difficult, possibly leading to accidents.

30        The object of the present invention is to provide a novel coupling member which avoids at least some of the disadvantages of the prior art.

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According to the present invention there is provided a coupling member including :

a body portion formed with the hook;

5 a closure shaft slidably mounted in the body for movement between open and closed positions; and

a locking member carried by the closure shaft and being movable between locked and unlocked positions, the arrangement being such that when the locking member is in its locked position, it prevents movement of the closure shaft from its closed position.

10 Preferably, the locking member includes a locking pin which is slidably mounted in the closure shaft, the pin having a head and wherein the body portion includes a slot, the arrangement being such that the locking pin needs to be moved to its unlocked position so that the pin can move in the slot when the closure shaft moves.

15 Preferably, the hook has a terminal portion which is transverse to the direction of movement of the closure shaft.

Preferably further, the terminal portion includes a recess which receives a free end of the closure shaft in its closed position.

20

This arrangement has the advantage that there are no gaps between the free end of the closure shaft and the hook which can sometimes occur in known forms of shackle. Further, because the terminal portion of the hook is transverse to the direction of movement of the closure shaft, uncoupling of a line can be carried out by sliding the line  
25 over the terminal portion.

Preferably further, the closure shaft is biased towards its closed position.

Preferably further, the locking member is in the form of a locking pin. Preferably  
30 the locking pin is biased towards its locked position.

- 3 -

Preferably, the closure shaft is biased towards its closed position by means of a compression spring. Preferably further, the compression spring acts between one end of the closure shaft and a screw which forms a swivel connection for an eyelet mounted on the body remote from the hook.

5

The invention will now be further described with reference to the accompanying drawings, in which:

Figure 1 is a fragmentary view of a known form of shackle;

Figure 2 is a longitudinal cross-section through a coupling member of the invention  
10 in a locked position;

Figure 3 is a longitudinal cross-section through the coupling member in an open position;

Figure 4 is a plan view of the coupling member with the sleeve removed; and

Figure 5 is a transverse cross-section along the line 5-5.

15

Figure 1 shows a known form of shackle 2. The shackle includes a hook portion 4 having a terminal portion 6. The shackle includes a springloaded closure shaft 8 which is mounted in a body part 10 of the shackle. The shaft 8 can be moved by means of a tab 12 which is movable in a slot (not shown) in the body part 10. In the closed position shown in  
20 Figure 1, the hook 4 co-operates with the closure shaft 8 to form a closed loop for coupling to a line 14. This type of shackle has disadvantages which can cause serious problems in some applications, such as mountaineering and/or cave diving and the like. First, there is sometimes a gap 16 between the free end of the locking shaft 8 and the terminal portion 6 of the hook. If the shackle and/or line are moved laterally the line may cause displacement  
25 of the shaft and inadvertent de-coupling of the line. Another disadvantage is that when the line 14 is under tension, it needs to be moved against the tensile force, i.e. in the direction of the body 10, in order that it can clear the terminal portion 6 of the hook. This can be very difficult where the tensile forces are high. The shackle 2 normally has an eyelet 17 which is permanently coupled to the body part 10 by means of a rivet 18. This reduces the  
30 flexibility of the shackle because sometimes an open hook rather than an eyelet may be required at the other end of the shackle.

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Figures 2 to 5 show a preferred form of coupling member 20 of the invention. The coupling member includes a cylindrical body 22 which is formed with a hook 24 having a terminal portion 26. The body 22 includes a cylindrical bore 28 within which is mounted a closure shaft 30 having an outer end 32 and an inner end 34. The coupling member 20 includes an eyelet 36 which is connected to the body 22 by means of a screw 38 which is received within a threaded end 40 of the bore 28. The screw 38 permits the eyelet 36 to rotate or swivel, in the usual way. A compression spring 42 is located within the bore and acts between the inner end 34 of the shaft and the inner end of the screw 38. The spring 42 biases the shaft 30 towards the terminal portion 26 of the hook. The terminal portion 26 of the hook includes a recess 44 which receives the outer end 32 of the shaft 30 when in the closed position, as shown in Figure 2. This forms a very secure connection between the free end of the shaft 30 and the hook 24.

The coupling member 20 includes a locking pin 50 having a head 52 at one end and threads at the other. A dome nut 54 is mounted on the threaded end of the pin 50. The pin 50 is slidably mounted in a transverse bore 56 which extends through the shaft 30. A compression spring 58 is mounted on the pin 50 and acts between the nut 54 and the shaft 30 and operates to bias the head 52 of the pin towards the shaft 30. It will be appreciated that the pin 50 is movable with the shaft 30 and in order to accommodate this movement, the body 22 is provided with upper and lower slots 60 and 62.

The head 52 of the pin includes a frustoconical portion 64. The frustoconical portion 64 is seated within a countersunk hole 66 which is formed at the end of the upper slot 60 adjacent to the hook 24, as best seen in Figures 2 and 5. When the pin 50 is in its locked position, as shown in Figure 1, the head 52 is seated within the hole 66 and this prevents movement of the pin 50 in the slots 60 and 62 because the frustoconical portion 64 is wider than the width of the slots 60 and 62. This correspondingly prevents movement of the shaft 30 out of its locked position as shown in Figure 2.

- 5 -

The coupling member 20 includes a sleeve 70 which has an internal bore 72 enabling it to slide over the cylindrical outer surface of the body 22. The sleeve includes a first bore 74 to enable the head 52 of the pin to pass therethrough and a second bore 76 to enable the dome nut 54 to pass therethrough. Adjacent to the bore 76 are gripping  
5 projections 78 and 80 which are preferably formed with ribbed surfaces, as shown for enabling a user to obtain a good purchase thereon.

Figure 2 shows the coupling member 20 in a closed position. It will be seen that the dome nut 54 does not extend beyond the projections 78 and 80. This minimises the  
10 possibility of inadvertent contact being made with the dome nut 54 which might cause movement of the locking pin 50 to its unlocked position. When the user wishes to release the coupling member, his or her finger is pressed against the dome nut 54 so as to push it inwardly. This elevates the head 52 out of the countersunk hole 66. The user can then  
15 slide the sleeve 70 in a direction away from the hook 24. The pin 50 will move in the slots 60 and 62 and the shaft 30 will be carried with the pin to its open position, as shown in Figure 3. Upon release of the sleeve 70, the compression spring 42 will act to return the shaft 30 to its closed position and the spring 58 will cause the pin 50 to return to its locked position, as shown in Figure 1. In the illustrated arrangement, the coupling member  
20 includes an eyelet 36 but it is to be understood that other components could be connected to the body or alternatively the body 22 could be integrally formed with a fixed eyelet. In a still further modification, the eyelet 36 could be replaced by a component which was a duplicate of the body 22 so that it effectively constituted a double ended securely closing coupling member.

25 The coupling member of the invention can be made in various sizes, say having an overall length in the range from 60mm to 200mm. In the preferred arrangement, the length is about 124mm. The diameter of the shaft 30 can be in the range from say 3mm to 10mm and preferably is 5mm in diameter. The depth of the recess 44 can be in the range from 1.5mm to 7mm and is preferably about 3mm.

30

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The coupling member 20 can be made from materials suited to various applications. For maximum strength and security, it is preferred that the body 22 is made from titanium. Similarly, the shaft 30 and eyelet 36 can be made from titanium. The screw 38 and pin 50 can also be made of titanium but commercially available stainless steel components could be used for these parts. The sleeve 70 can be moulded from a durable plastics material such as ABS. Alternatively, the various components could be made from stainless steel, brass or other durable material.

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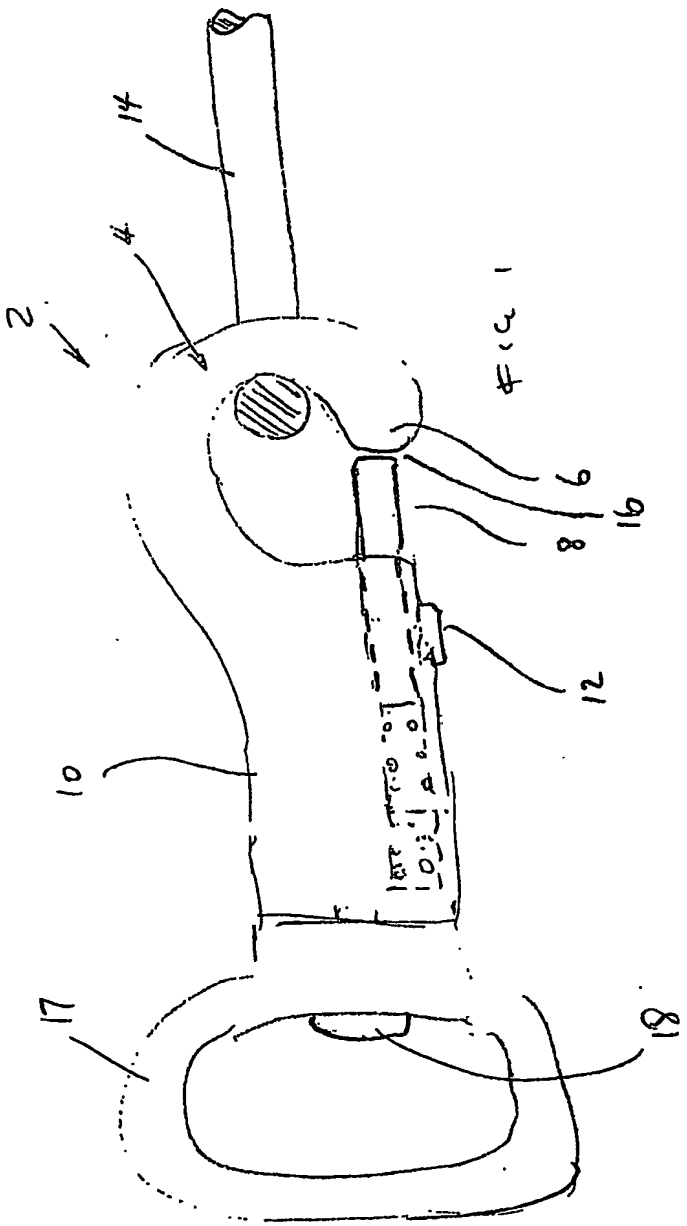
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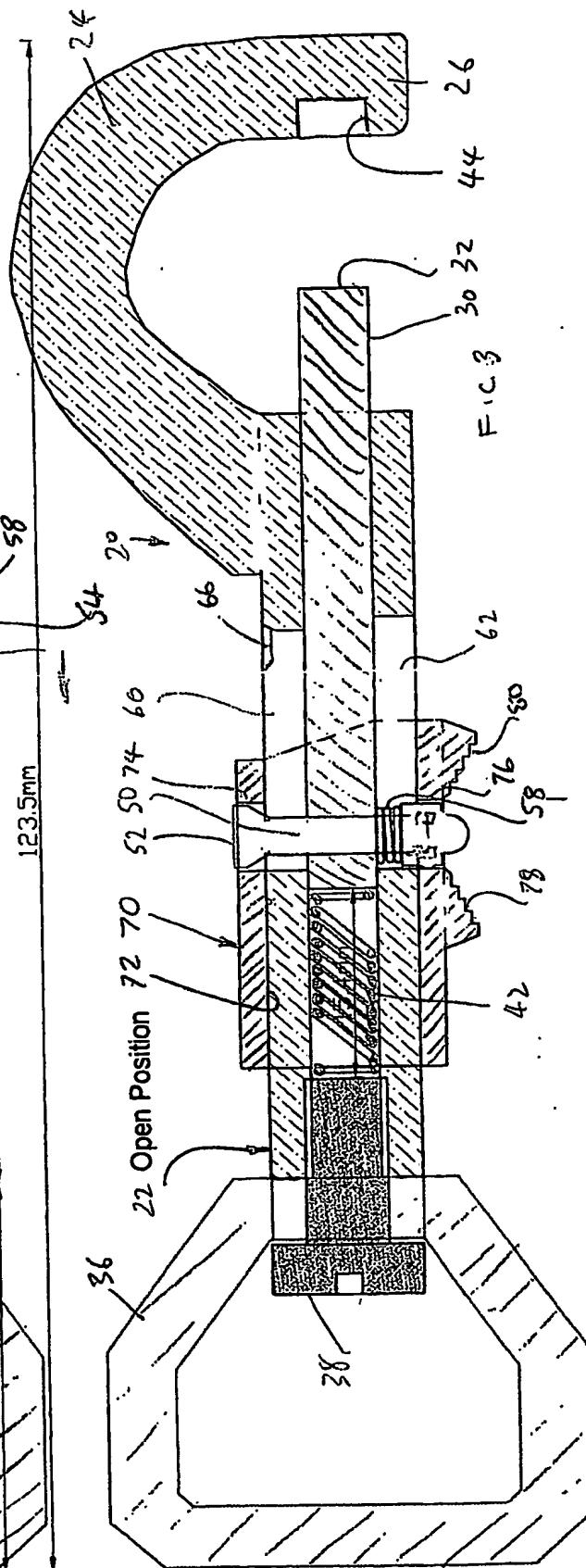
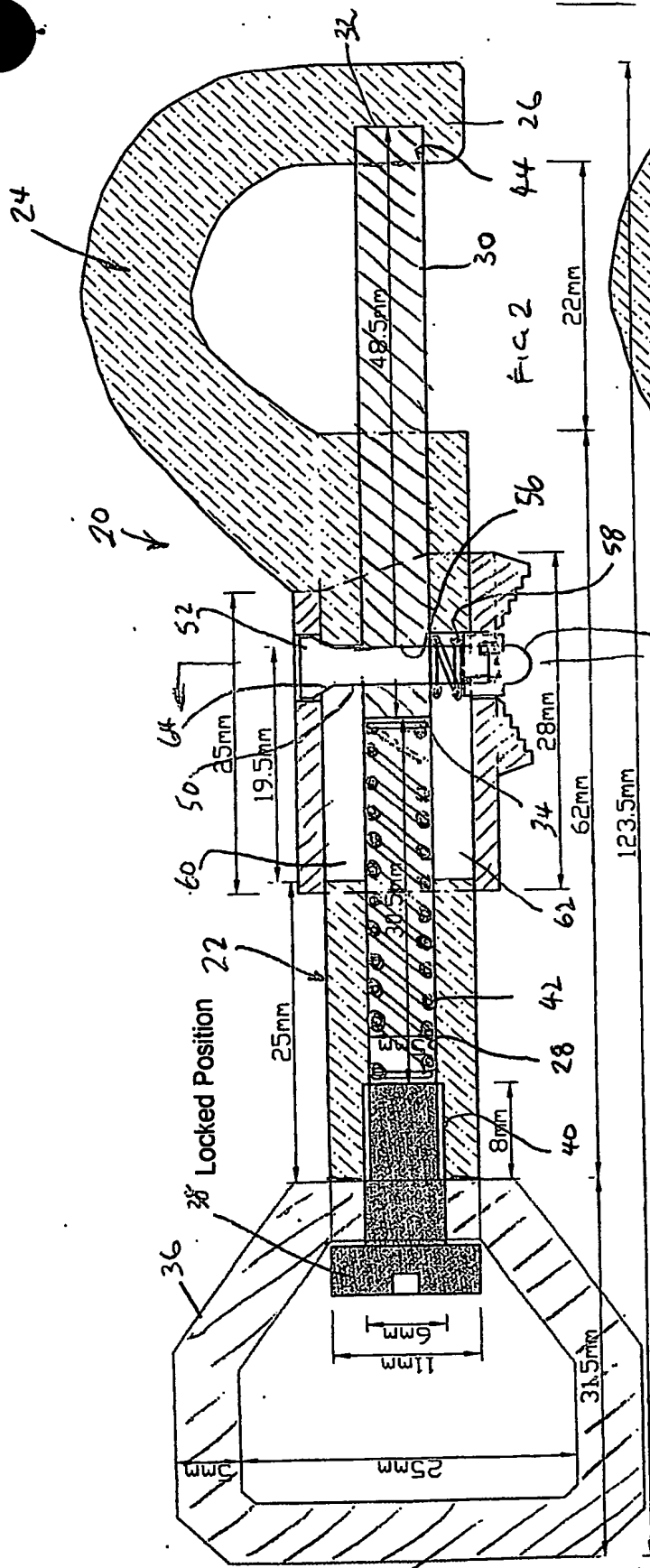
EDWARD DAVID ANSTEE

By his Patent Attorneys

20 DAVIES COLLISON CAVE







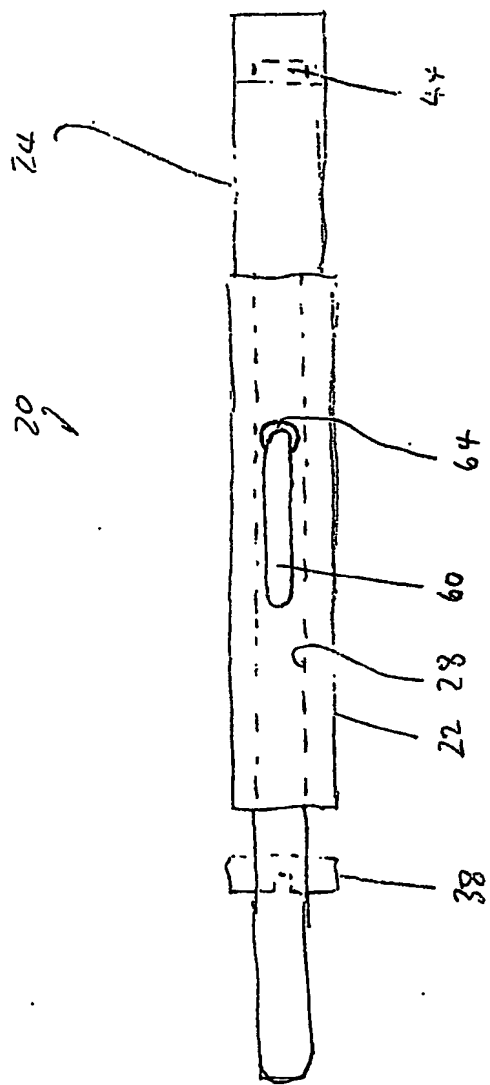
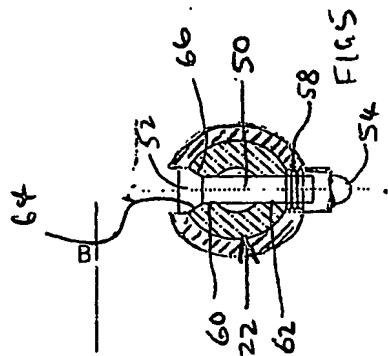


FIG 4



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